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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/497,993	02/04/2000	Bradley Paul Barber	2925-0401P	8152
30595	7590	06/16/2004		
HARNES, DICKEY & PIERCE, P.L.C. P.O. BOX 8910 RESTON, VA 20195			EXAMINER TUGBANG, ANTHONY D	
			ART UNIT 3729	PAPER NUMBER
DATE MAILED: 06/16/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/497,993

Applicant(s)

BARBER ET AL.

Examiner

A. Dexter Tugbang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,10-13,15,16,30 and 32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,10-13,15,16,30 and 32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/12/04 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 13, 15, 16, 30 and 32 rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Fujii et al 5,868,948, the Applicants Admitted Prior Art, referred to hereinafter as the AAPA, and EerNisse et al 5,022,130.

Regarding Claim(s) 1 and 13, Fujii discloses a method of producing a piezoelectric device comprising: depositing a first metal film 102 by sputtering directly on a substrate 101 (see Fig. 2); patterning the first metal film by achieving a certain thickness (see col. 4, lines 24-33); depositing a piezoelectric material on the first metal film to form a single continuous piezoelectric layer 103; depositing a second metal film 104 by sputtering on the single piezoelectric layer; patterning the second metal film to achieve a degree of thickness; and

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removing some of the piezoelectric material from the single piezoelectric layer not involved in signal transmission by a selective etching process after patterning of the second metal (see col. 4, lines 58-61).

It is noted that the piezoelectric material that is removed is considered to be "not involved in signal transmission" because the removed material is not part of the finished product or is not part of the operation of the device. Furthermore, the remaining piezoelectric material on the substrate is read as the "un-etched regions" and this remaining piezoelectric material is inherently limited in lateral propagation losses or lateral modes as compared to operation of the device if some of the piezoelectric material had not been removed.

Regarding Claim(s) 15, Fujii shows an example where some of the material of the substrate surface 1205 is removed by selective etching (see Fig. 12).

Regarding Claim(s) 16, Fujii shows at the bottom of Figure 2 that a "void" is formed on either side of the remaining piezoelectric material 103 and that this void is inherently back filled with a different material of at least air.

Regarding Claim(s) 30 and 32, the piezoelectric material of Fujii is not considered to be patterned until some of the piezoelectric material is removed.

Fujii does not mention that the device being manufactured is an "acoustic resonator device".

The AAPA (in Fig. 1) shows a similar structure of a single continuous piezoelectric layer between first and second metal films on a substrate and that this structure is utilized in a piezoelectric device of an acoustic resonator. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Fujii by producing

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an acoustic resonator device, as taught by the AAPA, since each produce art recognized equivalent structures of a piezoelectric layer between first and second metal films on a substrate.

If applicant(s) do not believe that removal of some of the piezoelectric material of Fujii inherently limits lateral propagation losses or lateral modes in the un-etched regions of the device, then EerNisse shows that removal of some of the piezoelectric material in a device limits and specifically controls propagation losses or lateral modes in the remaining or un-etched piezoelectric material by achieving a certain degree of vibration, i.e. propagation losses, to obtain a resonant frequency of the device (see col. 7, lines 20-53).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Fujii by limiting propagation losses and lateral modes in the un-etched regions of the device, as taught by EerNisse, to positively achieve a desired resonant frequency.

4. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art above, as applied to claim 1 above, and further in view of Zdeblick et al 5,129,132.

Fujii, as modified by the AAPA and EerNisse, discloses the claimed manufacturing method as previously discussed. The modified Fujii method does not teach the material of ZnO for the piezoelectric material (as required by Claim 10), lithographic patterning (as required by Claim 11), and that the substrate is formed from silicon.

Zdeblick shows a manufacturing process that includes a similar structure of having a piezoelectric layer between first and second metal films where the metal films are patterned specifically by lithographic patterning (see col. 8, lines 18-21), that the piezoelectric material can be formed of ZnO (see col. 7, lines 28-30), and that the substrate can be made of silicon (see col.

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6, lines 62-64). The benefits of the above manufacturing process allow control of the vibration, i.e. lateral propagation and lateral modes, of the device (see col. 3, lines 49-53).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Fujii by utilizing the materials and manufacturing process of Zdeblick, to positively control the lateral propagation and modes of the device.

Response to Arguments

5. Applicant's arguments with respect to claims 1, 10-13, 15, 16, 30 and 32 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Dexter Tugbang whose telephone number is 703-308-7599. The examiner can normally be reached on Monday - Friday 7:00 am - 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 703-308-1789. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



A. Dexter Tugbang
Primary Examiner
Art Unit 3729

June 14, 2004